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Application Number	10/816,007
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First Named Inventor	Timothy Hindle
Art Unit	3883
Examiner Name	Schwarz, Christopher P.
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ENCLOSURES *(Check all that apply)*

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  Submission of Appellant Appeal Brief

Remarks

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name	Ingrassia Fisher & Lorenz, PC		
Signature	*[signature]*		
Printed name	Alexander B. Ching		
Date	8-25-2006	Reg. No.	41,669

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

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In re application of:	Timothy Hindle et al.	Group Art Unit: 3683
Serial No.:	10/816,007	Examiner: Schwartz, Christopher P.
Filed:	March 31, 2004	Confirmation No.: 9568

For: A VISCOUS ISOLATION AND DAMPING STRUT UTILIZING FLUID MASS EFFECT

Attorney Docket No.: H0003993.65575

SUBMISSION OF APPELLANT APPEAL BRIEF

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Appellant hereby submits its Appeal Brief in response to the final rejection of the subject patent application.

The Commissioner is hereby authorized to charge Ingrassia, Fisher & Lorenz, Deposit Account No. 50-2091, $500 for the filing of this Appeal Brief.

Respectfully submitted,

Dated 8-25-2006

Alexander B. Ching
Registration No. 41,669

Ingrassia, Fisher & Lorenz
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re application of: Hindle, Timothy, et al.		Group Art Unit: 3683
Serial No.:	10/816,007	Examiner: Schwartz, Christopher P.
Filed:	March 31, 2004	Confirmation No. 9568

For: A Viscous Isolation and Damping Strut Utilizing a Fluid Mass Effect

Docket No.: H0003993.65575

Customer No.: 000128

APPEAL BRIEF PURSUANT TO 37 C.F.R. § 41.37

Appellants hereby resubmit their Appeal Brief in response to the Final Office Action mailed February 15, 2006 and the Decision of the Pre-Appeal Board of July 25, 2006.

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I. Introduction

This is an Appeal Brief under 37 C.F.R. § 41.37 appealing the final rejection of the Examiner dated February 15, 2006 and the Decision of the Pre-Appeal Board of July 25, 2006. Each of the topics required by 37 C.F.R. § 41.37 is presented in this Brief and is labeled appropriately.

II. Real Party in Interest

Honeywell International, Inc. ("Honeywell") is the real party in interest of the present application. An assignment of all rights in the present application to Honeywell was executed by the inventors and recorded by the U.S. Patent and Trademark Office at reel 015180, frame 0246.

III. Related Appeals and Interferences

There are no appeals or interferences related to the present application of which Appellants are aware.

IV. Status of Claims

Claims 1-25, which are presented in the Claims Appendix, stand finally rejected. Accordingly, the Appellants hereby appeal the final rejection of Claims 1-25.

V. Status of Amendments

No amendments have been made after receipt of the Final Office Action of February 15, 2006.

VI. Summary of Claimed Subject Matter

Claim 1 discloses a vibration and isolation apparatus (FIG. 2, element 100; page 5, lines 11-19) that includes a fluid having a true fluid mass, a density and a viscosity (page 8, lines 6-9, page 8, lines 20-21). The isolator further includes a first fluid containment chamber containing a first portion of the fluid (FIG. 3, element 146; page 6, lines 23-25) and a second containment chamber containing a second portion of the fluid (FIG. 3, element 148; page 6, lines 23-25). An annular damping path (FIG. 3, element 122; page 6, lines 23-25) couples the first fluid containment chamber and the second fluid containment chamber and provides a fluid path between the first fluid containment chamber and the second fluid containment chamber (page 6, lines 23-25). The ratio of the cross-sectional area of the first fluid chamber to the cross-sectional area of the annular damping path is chosen to produce an effective mass of the fluid to enhance vibration damping and isolation, the effective fluid mass of the fluid greater than the true fluid mass. (page 10, line 4-page 11, line 13).

Independent claim 8 discloses a fluid filled isolator (FIG. 2, element 100) for vibration damping and isolation. The isolator has a mechanical equivalent of a first spring force (FIG. 5, element K_A; page 6, lines 25-27) in parallel with a second spring force (FIG. 5, element K_B; page 7, lines 13-23), an effective fluid mass (FIG. 5, element fluid mass; page 9, lines 16-19) based on a ratio of a cross-sectional area of a first fluid containment chamber and a second fluid containment chamber (page 10, line 4-page 11, line 13) and a damper in series (FIG. 5, element C_A; page 6, lines 29-31).

Independent claim 16 discloses a four-parameter fluid filled damping and isolation apparatus. The apparatus includes a shaft (FIG. 3, element 102; page 5, lines 20-22) having a first and second end (FIG. 3, elements 106 and 108, respectively; page 5, lines 22-23) and an axis (FIG. 3, element 104; page 5, lines 26-27) therethrough. A piston having an axial bore (FIG. 3, element 120; page 6, lines 1-5) is positioned coaxially with the shaft to provide a first parameter (page 6, lines 23-26) comprising a damper (FIG. 5, C_A; page 6, lines 29-31) by forming a damping path (FIG. 3, element 122; page 6, lines 2-3) therebetween. The piston

includes a flange (FIG. 3, element 126; page 6, lines 4-6) extending radially therefrom for coupling the apparatus to a load. A first extension (FIG. 3, element 110; page 5, lines 23-27) is coupled to and extends radially from the first end of the shaft. A second extension (FIG. 3, element 112; page 5, lines 23-27) is coupled to and extends radially from the second end of the shaft. A secondary isolation means (FIG. 3, elements 150, 152; page 7, lines 16-23) coaxially extends from the first and second extensions for providing a second parameter (FIG. 5, element K_B; page 7, lines 13-23) comprising a first volumetric stiffness in series with the damper. A primary isolation means (FIG. 3, elements 138 and 140; page 6, lines 25-29) connects the flange to the first extension and the second extension and is coaxial with the shaft for providing a third parameter (FIG. 5, K_A; page 6, lines 25-27) comprising a second volumetric stiffness in parallel with the damper and the secondary isolation means. The secondary isolation means connects to the primary isolation means via fluid paths through the first and second extensions. A fourth parameter (FIG. 5, element fluid mass) comprises the ratio of a cross-sectional area of the primary-isolation means to a cross-sectional area of the damping path (page 10, line 49-page 11, line 13). The ratio is chosen to provide a fluid mass effect determined by an effective mass of the fluid, which is greater than a true fluid mass.

Claim 21 discloses an isolation and vibration damping system that includes a platform for securing a payload (page 5, lines 4-5). A plurality of isolation struts are attached at one end to the platform and at a second end to a base (page 5, lines 1-6). The mechanical equivalent of each of the plurality of isolation struts are four tunable parameters (FIG. 5; page 9, lines 16-18). The four tunable parameters include a first spring force (FIG. 5, element K_A; page 6, lines 25-27) in parallel with a second spring force (FIG. 5, element K_B; page 7, lines 13-23), an effective fluid mass based on a ratio of a cross-sectional area of a first fluid containment chamber and a second fluid containment chamber to a cross-sectional area of an annular damping path (FIG. 5, element fluid mass; page 10, line 4 to page 11, line 12) and a damper in series (FIG. 5, element C_A; page 6, lines 29-31).

VII. Grounds of Rejection to be Reviewed on Appeal

The grounds of rejection to be reviewed in this appeal are as follows:

1. Claims 1-25 stand rejected under 35 U.S.C. § 103(a) as obvious over U.S. Patent No. 5,332,070 to Davis (hereinafter "*Davis*") in view of U.S. Patent No. 4,872,649 to Kawamata (hereinafter "*Kawamata*") or U.S. Patent No. 4,811,919 to Jones (hereinafter "*Jones*").

VIII. Arguments

A. CLAIMS 1-25 ARE NOT UNPATENTABLE UNDER 35 U.S.C. § 103(a) OVER *DAVIS* IN VIEW OF *KAWAMATA* OR *JONES*.

The Final Office Action of February 15, 2006, rejected claims 1-25 under 35 U.S.C. § 103(a) as being unpatentable over *Davis* in view of *Kawamata* or *Jones*. As will be explained in more detail herein below, this rejection is not tenable.

1. *Davis*

Davis discloses a three parameter isolator (column 4, lines 44-45) comprising a spring, K_B, in conjunction with a damper, C_A, both of which are in parallel with a spring, K_A.

2. *Kawamata*

Kawamata discloses a mass damper that avoids the formation of higher-order resonance by utilizing the inertial resistance (column 2, lines 12-22) of a flowing liquid. (see Abstract). *Kawamata* further discloses a fluid mass in a system in which a discharge tube connects to a liquid container and a fluid reservoir.

3. *Jones*

Jones discloses a fluid mount for mounting an aircraft. The mount includes a frame fastened to the engine and a support that can receive a wing pylon shaft. Opposed liquid filled chambers are fluidly interconnected. (see Abstract). *Jones* discloses the determination of the inertia slug of fluid (column 7, lines 37-50).

4. Analysis

It is well settled that the Examiner bears the initial burden of establishing a *prima facie* case of obviousness. *In re Fine*, 837 F.2d 1071, 1074 (Fed. Cir. 1988). Before prior art references can be combined or modified, there must be some suggestion or motivation found in the art to make the combination or modification. *In re Dance*, 160 F.3d 1339, 1343 (Fed. Cir. 1998); *Heidelberger Druckmaschinen v. Hantscho Commercial*, 21 F.3d 1068, 1072 (Fed. Cir. 1994). "It is insufficient to establish obviousness that the separate elements of the invention existed in the prior art, absent some teaching or suggestion, in the prior art, to combine the elements." *Arkie Lures, Inc. v. Gene Larew Tackle, Inc.*, 119 F.3d 953, 957 (Fed. Cir. 1997).

Moreover, a claim cannot be found *prima facie* obvious unless all the elements of the claim are taught or suggested in the cited art. *In re Royka*, 490 F.2d 981, 180 U.S.P.Q. 580 (C.C.P.A. 1974); *In re Wilson*, 424 F.2d 1382, 1385 (C.C.P.A. 1970) ("All words in a claim must be considered in judging the patentability of that claim against the prior art."). Just because a prior art reference *can* be modified does not render the proposed modification obvious unless the prior art suggests the desirability of making the proposed modification. *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990). In addition, there must be some reasonable expectation of success. *In re Merck*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Appellants submit that the Examiner has not met his burden in establishing a *prima facie* case of obviousness, because there is no suggestion or motivation to combine the cited prior art references and because the prior art references do not teach or suggest all of the claim elements.

a. THE EXAMINER IS ENGAGING IN HINDSIGHT RECONSTRUCTION

The Examiner's rejections of claims 1-25 using the combination of *Davis* and *Kawamata* or *Davis* and *Jones* is based on hindsight reconstruction and therefore should be withdrawn. The Examiner argues that Davis discloses the present invention except for the identification of fluid mass and how the fluid mass may be adjusted. The Examiner further argues that it is notoriously well known to adjust various parts of fluid mounts and dampeners to make use of the fluid inertia effect and that such adjustment is generally taught by *Kawamata* and *Jones*. The Examiner then concludes it would be obvious to one of skill in the art to modify one of the parameters of *Davis* to achieve a dampener that utilizes fluid mass as taught by *Kawamata* or *Jones*.

What the Examiner fails to do is show how the prior art discloses, teaches or suggest the proposed combination. Note that there is no disclosure, teaching or suggestion in *Davis* to add a fourth tunable parameter or what parameters could be adjusted to provide a new tunable parameter. In addition, there is no recognition in *Davis* that a fourth parameter can be derived from the system of *Davis*, especially a fourth parameter that uses the fluid in the annular damping region. Neither *Jones* nor *Kawamata* discloses, teaches, or suggests a tunable parameter as disclosed in the present invention. Indeed, *Jones* and *Kawamata* are cited for the proposition that it is well known to vary parameters of fluid mounts and dampeners by adjusting cross-sectional areas of fluid paths and pistons. However, the argument not being addressed by the Examiner is that while *Jones* and *Kawamata* teach the well-known fact that parameters in dampeners can be adjusted; they do not teach which parameters need to be adjusted.

Thus, the Examiner has argued is that it would be obvious to take *Davis* and try a variety of different adjustments until a fourth tunable parameter as disclosed in the claims was found. What the Examiner is arguing is that it would be obvious to try adjustments, an illegitimate basis for an obviousness rejection. In *In re O'Farrell*, the Federal Circuit held that while at times the meaning of the maxim obvious to try is sometimes lost, "[t]he admonition that obvious to try is not the standard under § 103 has been directed mainly at two kinds of error. In some cases, what would have been obvious to try would have been to vary all parameters or try each of numerous possible choices until one possibly arrived at a successful result, where the prior art gave either

no indication of which parameters were critical or no direction as to which of many possible choices is likely to be successful. *E.g., In re Geiger*, 815 F.2d at 688, 2 USPQ2d at 1278; *Novo Industri A/S v. Travenol Laboratories, Inc.*, 677 F.2d 1202, 1208, 215 USPQ 412, 417 (7th Cir.1982); *In re Yates*, 663 F.2d 1054, 1057, 211 USPQ 1149, 1151 (CCPA 1981); *In re Antonie*, 559 F.2d at 621, 195 USPQ at 8-9." *In re O'Farrell*, 853 F.2d 894, 903 (Fed. Cir. 1988). The Examiner's argument is same as the erroneous approach discussed above; the Examiner argues that parameters of the isolator can be varied until the approach of the present invention is reached even though the prior art gives no indication of the critical parameters or which choices are likely to succeed. Thus, for at least this reason, the rejection of claims 1-25 should be withdrawn.

b. INDEPENDENT CLAIM 1 AND ITS DEPENDENT CLAIMS ARE ALLOWABLE

1. Claim 1

Claim 1, recites, in part, "wherein the ratio of the cross-sectional area of the first fluid containment chamber and the second fluid containment chamber to the cross-sectional area of the annular damping path is chosen to produce an effective mass of the fluid to enhance vibration damping and isolation." As the Examiner points out, this limitation is not found in *Davis*. The addition of *Jones* fails to disclose, teach, or suggest producing an effective mass as in claim 1. *Jones* discloses a fluid "slug", which is simply an amount of fluid in part of the *Jones* apparatus. Additionally, nowhere in *Jones* is the ratio of the cross-sectional area of a first and second fluid containment chamber and the annular damping path disclosed. For at least these reasons, the *Davis/Jones* combination fails to render claim 1 obvious. While *Jones* may teach adjusting known parameters, as the Examiner asserts, *Jones* does not disclose, teach, or suggest the adjustment of the parameters in the present invention necessary to achieve the effective mass of the fluid as in claim 1.

Kawamata does mention the determination of an effective fluid mass. However, in *Kawamata* the fluid mass is caused by a discharge tube that feeds two fluid containers. Thus, *Kawamata* does not show a damping system "wherein the ratio of the cross-sectional area of the first fluid containment chamber and the second fluid containment chamber to the cross-sectional

area of the annular damping path is chosen to produce an effective mass of the fluid to enhance vibration damping and isolation." Thus, at the very least, the proposed combination fails to disclose, teach or suggest this limitation.

In order to render claim 1 obvious, it is not enough for the prior art to disclose the same or similar terminology as in the claims of the present invention, such as "fluid mass" or "fluid slug," or that certain parameters in a damping system can be adjusted to tune performance. Instead, as discussed previously, all claim limitations must be taught or suggested, including the parameters that are adjusted. A prima facie case for a section 103 rejection can not be made by simply arguing that art generically teaches the adjustment of parameters, which is the proposition for which the Examiner cites *Kawamata* and *Jones*. The prior art combination must show all claim limitations including a showing that the effective mass of the fluid to enhance vibration damping and isolation is based on a ratio "of the cross-sectional area of the first fluid containment chamber and the cross-sectional area of the second fluid containment chamber to the cross-sectional area of the annular damping path." For at least these reasons, claim 1 and all claims depending from claim 1 are in condition for allowance.

2. Claim 2

Considering claim 2, neither the *Davis/Jones* combination nor the *Davis/Kawamata* combination discloses, teaches or suggests "wherein the cross-sectional area of the damping path can be changed to permit active tuning of the effective mass of the fluid." As discussed in conjunction with claim 1, neither the *Davis/Jones* combination nor the *Davis/Kawamata* combination discloses, teaches or suggests the effective fluid mass is based on a ratio "of the cross-sectional area of the first fluid containment chamber and the cross-sectional area of the second fluid containment chamber to the cross-sectional area of the annular damping path." Logically, the proposed art combinations can not then teach the adjustment of the damping path. For at least this reason, claim 2 is in condition for allowance.

3. Claim 3

Considering claim 3, neither the *Davis/Jones* combination or the *Davis/Kawamata* combination discloses, teaches or suggests "wherein the cross-sectional area of the first fluid containment chamber or the second fluid containment chamber can be varied to permit active tuning of the effective mass of the fluid." As discussed in conjunction with claim 1, neither the *Davis/Jones* combination nor the *Davis/Kawamata* combination discloses, teaches or suggests the effective fluid mass is based on a ratio "of the cross-sectional area of the first fluid containment chamber and the cross-sectional area of the second fluid containment chamber to the cross-sectional area of the annular damping path." Logically, the proposed art combinations can not then teach the adjustment of the cross-sectional area of the first and second fluid containment chambers." For at least this reason, claim 3 is in condition for allowance.

4. Claim 5

Considering claim 5, neither the *Davis/Jones* combination nor the *Davis/Kawamata* combination discloses, teaches or suggests, "wherein the true mass of the fluid is less than the mass of the payload and the effective mass of the fluid is greater than or equal to the mass of the payload". None of the cited references, either alone or in combination, disclose, teach or suggest basing the effective mass on the payload mass. For at least this reason, claim 5 is in condition for allowance.

5. Claim 6

Considering claim 6, neither the *Davis/Jones* combination nor the *Davis/Kawamata* combination discloses, teaches, or suggests, "wherein the effective fluid mass of the fluid is chosen to give the apparatus a roll-off of –60dB per decade for at least one decade after a significant resonance." *Jones* and *Kawamata* do not disclose a roll off. In *Davis*, the roll off for a three parameter system is about -40dB per decade. This can be observed in Fig. 1C of *Davis*.

In Fig. 1C, line 210 is a line for a three parameter system. At 10 Hz the transmissibility is a little more than about -30 dB. At 100 Hz the transmissibility is about -70 dB. Thus, for one decade (10^1 to 10^2 Hz), the change in the transmissibility, or roll-off, is -40 dB. For at least this reason, claim 6 is in condition for allowance.

c. INDEPENDENT CLAIM 8 AND ITS DEPENDENT CLAIMS ARE ALLOWABLE

1. Claim 8

Considering independent claim 8, as discussed in conjunction with claim 1, neither the *Davis/Jones* combination nor the *Davis/Kawamata* combination discloses, teaches or suggests an "isolator comprising four tunable parameters." Further, the proposed combination fails to disclose, teach or suggest that one of the tunable parameters comprises "an effective fluid mass, the effective fluid mass based on a ratio of a cross-sectional area of a first fluid containment chamber and a second fluid containment chamber to a cross-sectional area of an annular damping path." For at least these reasons, claim 8 and all claims depending from claim 8 are in condition for allowance.

2. Claim 10

Considering claim 10, neither the *Davis/Jones* combination nor the *Davis/Kawamata* combination discloses, teaches or suggests, "wherein the true fluid mass is less than a mass of a payload coupled to the isolator and the effective mass is equal to or greater than the mass of the payload." As discussed previously, none of the cited references, alone or in combination, disclose basing the effective mass on the mass of a payload. For at least this reason, claim 10 is in condition for allowance.

3. Claim 15

Considering claim 15, neither the *Davis/Jones* combination nor the *Davis/Kawamata* combination discloses, teaches, or suggests, "wherein the effective fluid mass of the fluid is chosen to provide a roll-off of –60dB per decade for at least one decade after a significant resonance." As discussed in conjunction with claim 6, *Jones* and *Kawamata* do not disclose a roll off. In *Davis*, the roll off for a three parameter system is about -40 dB per decade. Thus, claim 15 is in condition for allowance.

d. INDEPENDENT CLAIM 16 AND ITS DEPENDENT CLAIMS ARE ALLOWABLE

1. Claim 16

Independent claim 16, as amended, recites, in part, "a fourth parameter comprising the ratio of a cross-sectional area of the primary–isolation means to a cross-sectional area of the damping path, the ratio chosen to provide a fluid mass effect, the fluid mass effect determined by an effective mass of the fluid, the effective mass of the fluid greater than a true fluid mass." This is similar to the limitation discussed previously in conjunction with claim 1 and claim 8. As the Examiner points out, *Davis* does not disclose a fourth parameter. *Jones* and *Kawamata* merely disclose tuning known parameters and not tuning the specific parameters as in claim 16. Thus the proposed *Davis/Jones* or *Davis/Kawamata* combinations fail to disclose, teach or suggest all the limitations of claim 16. For at least this reason, claim 16 and all claims depending from claim 16 are in condition for allowance.

2. Claim 18

Considering claim 18, neither the *Davis/Jones* combination nor the *Davis/Kawamata* combination discloses, teaches or suggests "wherein the cross-sectional area of the damping path can be changed to permit active tuning of the fluid mass effect." This limitation was discussed

earlier in conjunction with claim 3, where it was noted the prior art, alone or in combination, failed to disclose, teach, or suggest this limitation. For at least this reason, claim 18 is in condition for allowance.

3. Claim 19

Considering claim 19, neither the *Davis/Jones* combination nor the *Davis/Kawamata* combination discloses, teaches, or suggests, "wherein the fluid mass effect is chosen to give the apparatus a roll-off of –60dB per decade for at least one decade after a significant resonance." *Jones* and *Kawamata* do not disclose a roll off. In *Davis*, the roll off for a three parameter system is about -40dB per decade. This was discussed previously in conjunction with claim 6. For at least this reason, claim 19 is in condition for allowance.

e. INDEPENDENT CLAIM 21 AND ITS DEPENDENT CLAIMS ARE ALLOWABLE

1. Claim 21

Considering claim 21, neither the *Davis/Jones* combination nor the *Davis/Kawamata* combination discloses, teaches, or suggests, "a plurality of isolation struts comprising four tunable parameters." *Davis* discloses only three tunable parameters and neither *Jones* nor *Kawamata* disclose additional tunable parameters. Additionally, neither the *Davis/Jones* combination nor the *Davis/Kawamata* combination discloses teaches or suggests "an effective fluid mass, the effective fluid mass based on a ratio of a cross-sectional area of a first fluid containment chamber and a second fluid containment chamber to a cross-sectional area of an annular damping path." For at least these reasons, claim 21 and all claims depending from claim 21 are in condition for allowance.

IX. Conclusion of Arguments

In view of the foregoing, Appellants submit that the final rejection of claims 1-25 is improper and should not be sustained. Therefore, a reversal of the rejections in the final Office action dated February 15, 2006, is respectfully requested.

Respectfully submitted,

Dated 8-25-2006

Alexander B. Ching
Registration No. 41,669

Ingrassia, Fisher & Lorenz
Customer No. 29,906

X. Claims Appendix

1. A vibration and isolation apparatus comprising:

a fluid having a true fluid mass, a density and a viscosity;

a first fluid containment chamber containing a first portion of the fluid;

a second containment chamber containing a second portion of the fluid;

an annular damping path connecting the first fluid containment chamber and the second fluid containment chamber and providing a fluid path between the first fluid containment chamber and the second fluid containment chamber; and

wherein the ratio of the cross-sectional area of the first fluid containment chamber and the second fluid containment chamber to the cross-sectional area of the annular damping path is chosen to produce an effective mass of the fluid to enhance vibration damping and isolation, the effective mass of the fluid greater than the true fluid mass.

2. The apparatus of claim 1 wherein the cross-sectional area of the damping path can be changed to permit active tuning of the effective mass of the fluid.

3. The apparatus of claim 1 wherein the cross-sectional area of the first fluid containment chamber or the second fluid containment chamber can be varied to permit active tuning of the effective mass of the fluid.

4. The apparatus of claim 1 wherein the apparatus supports a payload having a fixed mass.

5. The apparatus of claim 4 wherein the true mass of the fluid is less than the mass of the payload and the effective mass of the fluid is greater than or equal to the mass of the payload.

6. The apparatus of claim 1 wherein the effective fluid mass of the fluid is chosen to give the apparatus a roll-off of –60dB per decade for at least one decade after a significant resonance.

7. The apparatus of claim 1 wherein the density of the fluid can be changed to change the effective fluid mass.

8. A fluid filled isolator for vibration damping and isolation, the mechanical equivalent of the isolator comprising four tunable parameters and wherein the four tunable parameters comprising a first spring force in parallel with a second spring force, an effective fluid mass, the effective fluid mass based on a ratio of a cross-sectional area of a first fluid containment chamber and a second fluid containment chamber to a cross-sectional area of an annular damping path, and a first damper in series.

9. The isolator of claim 8 wherein the effective fluid mass is equal to the true fluid mass multiplied by an amplification factor.

10. The isolator of claim 9 wherein the true fluid mass is less than a mass of a payload coupled to the isolator and the effective mass is equal to or greater than the mass of the payload.

11. The isolator of claim 10 wherein the first spring force is formed by a stiffness formed by the design of a first fluid chamber and a second fluid chamber.

12. The isolator of claim 11 wherein the damper is substantially provided by the shear force of the fluid through a damping annulus located between the first fluid chamber and the second fluid chamber.

13. The isolator of claim 12 wherein the second spring force is formed from a volumetric stiffness of the first fluid containment chamber and the second fluid containment chamber and axial stiffness coupled to the first fluid containment chamber and the second fluid containment chamber.

14. The isolator of claim 13 wherein the effective fluid mass is proportional to the ratio of the cross-sectional area of the first fluid containment chamber and the second fluid containment chamber divided by the cross-sectional area of the damping annulus, the quantity squared.

15. The isolator of claim 8 wherein the effective fluid mass to payload mass is chosen to provide a roll-off –60dB per decade for at least one decade after a significant resonance.

16. A four-parameter fluid filled damping and isolation apparatus, comprising:

a shaft having an axis therethrough, the shaft having a first and second end;

a piston having an axial bore coaxially positioned with the shaft to provide a first parameter comprising a damper by forming a damping path therebetween, the piston having a flange extending radially therefrom for coupling the apparatus to a load;

a first extension coupled to and extending radially from the first end of the shaft;

a second extension coupled to and extending radially from the second end of the shaft;

secondary isolation means coaxially extending from the first and second extensions for providing a second parameter comprising a first volumetric stiffness in series with the damper;

a primary isolation means connecting the flange to the first extension and the second extension and coaxial with the shaft for providing a third parameter comprising a second volumetric stiffness in parallel with the damper and the secondary isolation means, the secondary isolation means connected to the primary isolation means via fluid paths through the first and second extensions; and

wherein a fourth parameter comprising the ratio of a cross-sectional area of the primary isolation means to a cross-sectional area of the damping path, the ratio chosen to provide a fluid mass effect, the fluid mass effect determined by an effective mass of the fluid, the effective mass of the fluid greater than a true fluid mass.

17. The apparatus of claim 16 wherein the cross-sectional area of the primary isolation means can be varied to permit active tuning of the fluid mass effect.

18. The apparatus of claim 16 wherein the cross-sectional area of the damping path can be changed to permit active tuning of the fluid mass effect.

19. The apparatus of claim 16 wherein the fluid mass effect is chosen to give the apparatus a roll-off of –60dB per decade for at least one decade after a significant resonance.

20. The apparatus of claim 16 wherein the fluid mass effect can be change by varying the mass of a fluid internal to the apparatus.

21. An isolation and vibration damping system comprising:

a platform for securing a payload; and

a plurality of isolation struts attached at one end to the platform and at a second end to a base, the mechanical equivalent of each of the plurality of isolation struts comprising four tunable parameters, the four tunable parameters comprising a first spring force in parallel with a second spring force, an effective fluid mass, the effective fluid mass based on a ratio of a cross-sectional area of a first fluid containment chamber and a second fluid containment chamber to a cross-sectional area of an annular damping path, and a damper in series.

22. The system of claim 21 wherein the first spring force is formed by a stiffness formed by the design of a first fluid chamber and a second fluid chamber.

23. The system of claim 22 wherein the damper is substantially provided by a shear force of a fluid through a damping annulus located between the first fluid chamber and the second fluid chamber.

24. The system of claim 23 wherein the second spring force is formed from a volumetric stiffness of the first fluid containment chamber and the second fluid containment chamber and

axial stiffness coupled to the first fluid containment chamber and the second fluid containment chamber.

25. The system of claim 24 wherein the effective fluid mass is proportional to the ratio of the cross-sectional area of the first fluid containment chamber and the second fluid containment chamber divided by the cross-sectional area of the damping annulus, the quantity squared.

XI. Evidence Appendix

No evidence pursuant to 37 C.F.R. §§ 1.130, 1.131, or 1.132 has been entered by the Examiner or relied upon by Appellants in the instant appeal beyond that which is already contained in the as-filed application, as is delineated in the Arguments section of this Brief.

XII. Related Proceedings Appendix

As there are no related appeals and interferences, there are also no decisions rendered by a court or the Board of Patent Appeals and Interferences that are related to the instant appeal.